

### Remarks

The Applicant has submitted form PTO/SB/08B including previously-submitted publication references numbers 20 and 24. These references were not considered by the Examiner because they were undated. The undersigned attorney has added publication dates to the references that are more than one year before the filing of the present application. These publication dates may not be the earliest publication dates of these references. The undersigned attorney found the "Wavelets" publication date from a book that is currently on sale by the same name and by the same authors. Both publications were referenced by US Patent Number 6,112,167 which issued August 29, 2000. The undersigned attorney has thus listed the publication date of the Williams reference to be at least the issued date of the 6,112,167 patent. The Applicant thus respectfully requests the Examiner to consider both references and return an initialed copy of the enclosed substitute 1449/PTO form with the Notice of Allowance requested by the Applicant.

The Applicant has submitted a Replacement Sheet including Figures 12 and 13 as requested by the Examiner.

The Applicant has amended the specification as suggested by the Examiner. The Applicant also has added the word "values" after the  $A_k$ .

The Applicant has amended the claims as suggested by the Examiner in response to the claim objections.

The Applicant has amended the claims in response to the rejections entered under section 112, second paragraph. The Examiner's suggestions were adopted with respect to most claims as noted below.

The Applicant respectfully traverses the rejections of claims 3, 17, and 21 regarding the meaning of the meaning of the "accumulation of the deviation of the arc length from the arc length of the mean pitch size." These limitations refer to the deviation of arcs measured in degrees from a reference point on the circumference of a tire. The accumulation of the deviation is a vector of the difference in the actual arc length (to the ith pitch) from a fixed arbitrary reference point along the tire (generally the start of a given pitch) to the end of the mean pitch (for the ith pitch). For example, the calculation for the twentieth pitch requires the summation of the length of pitches 1-20. Twenty times the mean pitch length is then subtracted from this summation to determine the difference – or deviation. The Applicant notes similar claims issued in US Patent 7,006,930. The Applicant thus submits these claim limitations meet the requirements of section 112 and respectfully requests the rejections to be withdrawn.

The Office Action rejects all the claims under 35 U.S.C. § 101 as claiming non-statutory subject matter. The Applicant respectfully traverses the rejections. Methods are patentable subject matter. Each claim recites the steps of defining a tire noise pitch sequence for a pneumatic tire. The tangible result is a tire noise pitch sequence that may be used in the design a pneumatic tire. A tire noise pitch sequence is tangible and not an abstract idea. Such tire noise pitch sequences are used to control tire noise in pneumatic tire applications.

Numerous patents (see Applicant's previous Information Disclosure Statements for examples) have issued for these types of useful methods. With respect to these rejections, the Applicant submits the Office Action does not establish a *prima facie* case of unpatentability under section 101. The Applicant thus respectfully requests the withdrawal of the rejections of the claims under section 101.

Rejections based on 35 U.S.C. § 103(a)

Claims 1-14

The Office Action rejects claims 1-2, 6, and 11 as being obvious over Sekula in view of Kogure. The Office Action also rejects claims 3-5, 7-10, and 12-14 as being obvious over the Sekula/Kogure combination in further view of Stuckey. The Applicant respectfully traverses these rejections. Each of these claims is based on the method recited in independent claim 1 which requires the modulation orders to be selected and defined prior to the development of the pitch sequence. The Applicant submits the combination of Sekula with Kogure fails to disclose, teach, or suggest this method. Further, the Applicant submits both references teach away from the claimed solution. As such, the Applicant submits the Office Action has not established a *prima facie* of obviousness with respect to independent claim 1 or any of its dependent claims.

Turning to the Graham analysis, the Applicant notes that in determining obviousness, one must (1) determine the scope and content of the prior art; (2) ascertain the differences between the prior art and the claimed invention; and (3) resolve the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*,

383 U.S. 1, 17 18, 148 USPQ 459, 467 (1966). Secondary considerations such as commercial success, long felt but unsolved need, and failure of others are also considered. Id. Thus, one first looks to the content of the Sekula and Kogure references and then identifies the differences between their content and the claimed invention. The determination of obviousness is made against this background. The Office bears the burden of establishing a *prima facie* case of obviousness. The teaching, suggestion, motivation analysis provides a helpful insight to whether or not an invention is obvious in view of the combination of other references. The MPEP sets forth that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestions or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. M.P.E.P. § 2142. Further, a patent composed of several elements (or steps) is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.

Sekula discloses a method for defining a tire noise pitch sequence from target audio spectrum such as a white noise spectrum. Sekula performs an inverse Fourier transform of a single period of the target audio spectrum, adjusts

the result to define a period proportional to the circumference of the tire, and then divides the result by the number of desired pitches. The pitch lengths are defined by the amplitude of the curve. The Applicant respectfully traverses the conclusion set forth in the Office Action that Sekula's selection of an audio spectrum discloses the "defining" steps of claim 1. The modulation order characteristics of Sekula's generated spectrum are not known, never calculated, and are certainly not defined as required by claim 1. However, the Applicant has amended claim 1 to require the first and second modulation orders to be defined to be smaller or equal to the third modulation order. Such a limitation is not disclosed in the Sekula reference. The selection of an audio spectrum in Sekula does not necessarily define the modulation orders in this manner. The drawback with the Sekula method is explained in Applicant's specification on page 3 with reference to Figs. 1 and 2. A pitch sequence yielding a desirable harmonic response in the audio spectrum may have undesirable modulation. This problem is addressed in the inventor's earlier patent publication US 2003/0040886 (now US Patent 7,006,930) wherein a secondary screening technique is disclosed. Sekula's method of design a pitch sequence is focused on the audio spectrum without regard for the secondary modulation noise. Sekula's method may thus create a tire noise pitch sequence having undesirable modulation as discussed on page 3 of Applicant's specification. Sekula thus does not disclose, teach, or suggest the steps of selecting and defining the modulation orders as recited in claim 1.

The Applicant also respectfully traverses the conclusion in the Office Action that Sekula's inverse Fourier transformation discloses the steps of creating individual modulation order functions and summing the created functions. Sekula discloses that the fast Fourier transformation (12) only acts on an audio spectrum that has already been generated by the audio spectrum generator (11). Sekula's method does not contemplate using the fast Fourier transformer to create and sum functions for the modulation orders as recited in claim 1.

The Applicant also respectfully traverses the conclusion set forth in the Office Action that Sekula defines the pitch sequence from the summation of the modulation order functions. Sekula teaches that the pitches are defined by an adjusted result of the inverse fast Fourier transformation of the audio spectrum. Defining a pitch sequence directly from the audio spectrum without regard to the modulation orders can yield undesirable results as noted above. Sekula thus does not disclose, teach, or suggest the step of defining a pitch sequence from the summation of modulation order functions.

Given the significant differences between claim 1 and the Sekula reference, the addition of the Kogure teachings does not render the invention obvious under section 103. Kogure merely teaches that the modulation orders under ten should be studied. Kogure concludes that varying the periods results in a dispersion of the pulsation. Kogure thus does not select a number of modulation orders, does not define the orders with functions, and does not sum the functions. Kogure merely teaches that an analysis of the modulation orders

is needed. This teaching, however, is acknowledged as prior art in Applicant's specification (page 8, line 4). Kogure thus discloses something that the Applicant already recognizes in its application. Kogure's use of this information leads in a different direction from that of the claimed invention. Kogure's solution to the pulsation problem is substantially different than Applicant's claimed invention. The combination of the Kogure teachings with the Sekula method would have led those of ordinary skill in the art to vary the fundamental periods of the sequence generated by the Sekula method (see Kogure, Col. 3, lines 30-45). Kogure thus teaches away from the claimed method and the combination of Kogure with Sekula does not yield the claimed invention.

The Stuckey reference cited as a tertiary reference against some of the dependent claims discloses a secondary screening technique to compare pitch sequences designed under other prior art design methodologies. The addition of the Stuckey teachings to the combination of Kogure and Sekula leads of ordinary skill in the art to compare different pitch sequences generated by the Kogure/Sekula teachings to determine which is better. The pitch sequences designed and compared by this combination would still be based on Sekula's audio spectrum combined with the period shifts of Kogure. The combined teachings of all three references does not render the method of claim 1 obvious. The Applicant thus respectfully requests the rejections of claims 1-14 to be withdrawn.

### Claims 15-18

The Office Action rejects claims 15-17 as being obvious in view of Sekula combined with Stuckey. Claim 18 has been rejected as being obvious in view of the Sekula/Stuckey combination in further view of Kogure. The Applicant respectfully traverses the rejections. As explained above, Sekula discloses a method for designing a pitch sequence from a desirable audio frequency spectrum while Stuckey discloses a secondary screening technique for analyzing the differences between competing pitch sequences such as those designed by Sekula. Claim 15 requires the design process to first define characteristics of tire noise attributed to the lug stiffness variations and then define the tire noise pitch sequence that yields the defined characteristics. Claim 15 thus has a completely different starting point for the pitch sequence design than the Sekula reference. Stuckey does not provide motivation for changing the starting point of the Sekula design methodology to that recited in claim 15. Stuckey leads one of ordinary skill in the art to avoid undesirable results by testing a plurality of Sekula pitch sequences and selecting the one with the best results. Stuckey does not contain motivation for altering the design methodology of Sekula to achieve the invention of claims 15-17. The addition of the Kogure teachings does not change the result.

### Claims 21-22

The Office Action rejects claims 21-22 as being obvious in view of the combination of Sekula, Kogure, and Stuckey. The Applicant respectfully

traverses the rejections. The content of these prior art references is noted above. The Applicant maintains, as above, that the combination of these references does not render the claimed invention obvious. The claimed invention requires the modulation orders to be selected, defined, and summed. A lug stiffness variation curve is then equated to the summation of the modulation order curves. This equation is then solved to determine the pitch sizes for the pitch sequence. The prior art combination cited in the office action disclosed a methodology that defines the pitches from an audio frequency spectrum (Sekula) and then alters the periods of the pitch sequence (Kogure) to vary the tire noise. The addition of the Stuckey reference teaches that different sequences may then be compared to select a more desirable sequence. Nothing in the combination of references motivates one of ordinary skill in the art to change the methodology of Sekula by abandoning the audio frequency spectrum in favor of defined modulation characteristics as required in claim 21. The Applicant thus submits claim 21 and its dependent claim are patentable over the cited art.

The Applicant has added new claims 23-24 and respectfully requests these claims to be examined. In view of the foregoing, the Applicant respectfully requests consideration of the claims and most earnestly solicits the issuance of a formal Notice of Allowance for the claims.

Please call the undersigned attorney if any issues remain after this amendment.



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I hereby certify that this Correspondence is being deposited with the United States Postal service with sufficient postage for first class mail in an envelope address to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 26, 2007.



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